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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/662,686	09/15/2003	Brian L. Tafel		9779

7590 01/11/2006
BRIAN L. TAFEL
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EXAMINER

MATECKI, KATHERINE A

ART UNIT PAPER NUMBER

3654

DATE MAILED: 01/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Interview Summary	Application No.	Applicant(s)	
	10/662,686	TAFEL, BRIAN L.	
	Examiner	Art Unit	
	Katherine Matecki	3654	

All participants (applicant, applicant's representative, PTO personnel):

(1) Katherine Matecki. (3) _____.

(2) Brian Tafel. (4) _____.

Date of Interview: 05 January 2006.

Type: a) ☒ Telephonic b) ☐ Video Conference
c) ☐ Personal [copy given to: 1) ☐ applicant 2) ☐ applicant's representative]

Exhibit shown or demonstration conducted: d) ☐ Yes e) ☒ No.
If Yes, brief description: _____.

Claim(s) discussed: none.

Identification of prior art discussed: none.

Agreement with respect to the claims f) ☐ was reached. g) ☐ was not reached. h) ☒ N/A.

Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: Examiner indicated that the Office is attempting to locate the response which Mr. Tafel says he filed on August 26, 2005 via express mail (tracking # EQ141868181US). A copy of the most recent response filed by applicant, received on 5/6/2005, is attached hereto for applicant's convenience. If the August 26 is not located, the examiner will call again to discuss filing a duplicate.

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims allowable, if available, must be attached. Also, where no copy of the amendments that would render the claims allowable is available, a summary thereof must be attached.)

THE FORMAL WRITTEN REPLY TO THE LAST OFFICE ACTION MUST INCLUDE THE SUBSTANCE OF THE INTERVIEW. (See MPEP Section 713.04). If a reply to the last Office action has already been filed, APPLICANT IS GIVEN A NON-EXTENDABLE PERIOD OF THE LONGER OF ONE MONTH OR THIRTY DAYS FROM THIS INTERVIEW DATE, OR THE MAILING DATE OF THIS INTERVIEW SUMMARY FORM, WHICHEVER IS LATER, TO FILE A STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. See Summary of Record of Interview requirements on reverse side or on attached sheet.


KATHY MATECKI
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 3600

Examiner Note: You must sign this form unless it is an Attachment to a signed Office action.

Examiner's signature, if required

Summary of Record of Interview Requirements

Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record

A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews

Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

37 CFR §1.2 Business to be transacted in writing.

All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:

- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:

- 1) A brief description of the nature of any exhibit shown or any demonstration conducted,
- 2) an identification of the claims discussed,
- 3) an identification of the specific prior art discussed,
- 4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
- 5) a brief identification of the general thrust of the principal arguments presented to the examiner,
(The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
- 6) a general indication of any other pertinent matters discussed, and
- 7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.



COPY

15 April 2005

TFW

Application No. 10/662,686

Response to your Office Action of 24 Jan 2005

Applicant: Brian L. Tafel

Filed: 15 Sept 2003

Examiner: Mr. John M. Jillions Art Unit 3654

Commissioner for Patents

P.O.Box 1450

Alexandria VA 22313-1450

Note: The text lines on the attached sheets had to be renumbered because of additional text; my page and line numbers correspond to this revision.

Ammendments to the Drawings :

The attached sheets of drawings include additions and changes to Fig.1 and Fig.2 to include every feature of the invention originally mentioned in the specification and in the claims.

Fig.1 (Amended) Although not included in the *original Specification*, New Roll Sensor 51 (RPM), Splicer Roll Sensor 52 (web velocity) were included by way of reference in the *Original Claim 4, line 3" a speed signal calculated . . quotient of web . . velocity . . divided by the indicated diameter of said second roll from a sensor. .on said transport and splicing apparatus. "* Using the web velocity from Sensor 52 (or Fig.2 53) divided by roll RPM from Sensor 51 provides said speed signal. New Roll Diameter Sensor 56 is cited in *original claim 4 ln. 5 "indicated diameter from a sensor"*.

Items number 3 and 4 have been moved for clarification per examiner.

Fig.2 (Amended) Tranciever 50 added per examiner. Element 51, 52, 53, 54 added as above. Driveshaft Sensor 53 counting RPM of Driveshaft 54 is an alternate way to sense the web velocity compared to Sensor 52 above. Expiring Roll Sensor 55, is again used to count the roll RPM, this time the expiring roll, to determine expiring roll RPM. Dancer Roll Web Tension Sensor 57 and Dancer Roll 58 added to provide the *"indicated web tension. . from a sensor"* (Referenced in *original Claim 4 line 15.*)

Fig.10 (Added) Shows the "computer operative means" in #2. line 6 of office action -previously not shown. Element numbers 59 - 65 added.

Attachment: 2 Replacement Sheets containing Fig. 1 and Fig. 2, and 2 Annotated Sheets showing changes
1 New Sheet containing Fig. 10

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Amendments to the Specification :

(The numbers in parenthesis to the right indicate locations of the missing element references)

Background of the Invention

(Page -1), line 3 after -- relates -- "to" added

(Page 0), line 7 after -- space -- "for" added

Detailed Description of the Preferred Embodiment

Page 2, line 1 after -- relates -- "to" added

line 20 after -- depleted -- add comma

line 23 after -- new roll, -- "and this --- assembly." added

line 25 after -- lift -- "it" deleted and "second roll assembly" added

Page 3, line 3 "web" was -- w b --

line 4 "moved" was -- mov d --

line 4 "the" was -- th --

line 4 "web-stand" was -- stand-web --

line 7 after -- wheels. -- "The arms --- roll." added

lines 11-18 after -- raised. -- "The splicer --- arms 7." added (3,5,6,11,13,14,15,56)

lines 21-30 after -- stand 2 -- "beneath --- assembly." added (16,23,28,50,51,52,53,54,55,57,58)

lines 35-36 after -- arms 17, -- "each --- and" added and "act" was -- acting --

Page 4, line 2 after -- combination -- "to" added

line 3 one of the "is shown" is deleted

line 10 "saddles 24" was -- 17 --

lines 11-12 after -- vehicle. -- "The splicing --- removed." added

line 14 "saddles 24" was -- saddl s 24 --

line 16 "supported" was -- support d --

lines 18-20 after -- illustrates the -- "splicing elements --- new roll 30." added (25,29,41)

line 20 after -- brackets 20 are -- "preferably" added

Page 5, line 5 "event" was -- even --

line 9 "39" added after -- splicing mechanism -- (39)

line 10 "44" added after -- track mechanism -- (44)

Page 5 line 16 after -- torque -- comma changed to period
line 19 "subsequent" was -- subsequent --
lines 20- 26 New Paragraph added

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Ammendments to the Claims:

Claims 1-6 and 8, 9-11 (amended), Claim 7 (previously allowed), Claim 12 (new)

Listing of the Claims:

Claim 1, lines 12-13 after -- rolls -- "hereinafter . . . respectively." added

line 14 "means, supporting" was -- means, engaged by --

line 15 -- coreshaft means -- deleted

line 17 after -- second roll -- "assembly" added

line 21 after -- remove -- "said" was "the"

line 22 "second roll" added before -- assembly --

line 23 "assembly" added after -- roll --

Claim 2, line 2 "and sensors" added after -- computer controls --

line 3 "battery" deleted

Claim 3, line 1 "an" was "said"

line 2 "consisting essentially of" was "consists"

line 3 "each gripper bar" was -- each bar --

line 7 "second roll assembly" was -- coreshaft --

line 10 after -- second roll -- "assembly" was added

Claim 4, line 5 "a web velocity sensor" was -- a sensor located on the web utilizing device --

Claim 5, line 10 "said roller shaft" was -- said shaft --

line 11 "dispensing first roll" was -- dispensing roll --

line 13 "second roll" was -- first roll --

line 16 "said roller shaft" was -- said shaft --

Claim 5 line 19 "rigidly attached" was -- attached --

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line 20 "the spliced webs dispensing simultaneously and in" was -- the dispensing web in --

line 21 "said first and second" was -- said dispensing first -- and "from said first roll" was "splice"

Claim 6, line 1 "remove said first roll" was -- remove said second roll --

line 7 "dispensing" was -- unwinding -- (changed for consistency)

line 8 "second roll" was -- first roll --

line 10 "first roll" was -- second roll --

line 13 "said first roll" was -- said second roll --

Claim 8, lines 2-8 after -- raise the -- added "carriage which supports: a roll. . . second roll"

line 9 before -- such that -- deleted "roller supporting, loading, splicing and core retrieval mechanisms"

Claim 9, line 3 after -- including, -- "but not limited to," deleted

line 6 before -- unwinding -- "said" deleted

Claim 10, line 1 after -- wherein -- "a sequence of" added

Claim 11, line 13 after -- first roll -- "assembly" deleted

line 14 "second roll" was -- second roll assembly --

Claim 12, (new) In the course of amending, it became apparent to me that I had overlooked explicitly specifying and claiming a method of coreshaft removal, transportation and reuse, although it was implicit in the specification.

Therefore, I have added Claim 12, and in the *Specifications* I have added Page 4 lines 11-12.

When the patent issues, please append reference to the Patent Assignment to Tafel and Associates, Inc. contained herein on the following page. This assignment is a duplicate of the original executed April 2005.

I welcome any assistance you may offer and will generally be accessible at home (847) 297 7121.

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Assignment of Rights: Patent Application

Brian L. Tafel ("Assignor") is owner of Vehicular Splicer as described in the U.S. Patent Application signed by Assignor on September 15, 2003, U.S. Patent and Trademark office Serial Number: 10/6626686, filed September 15, 2003, (the "Patent Application"). Tafel and Associates Inc. ("Assignee") an Illinois Corporation, desires to acquire all rights in and to the Patent Application and the patent (and any reissues or extensions) that may be granted.

Therefore in consideration for one-third of any profits or royalties which may accrue to Assignee during the Assignors lifetime from the commercial exploitation of said Patent Application and any subsequent Patents arising therefrom, Assignor assigns to Assignee 100% of his right, title, and interest in the invention and Patent Application (as well as such rights in any divisions, continuations in whole or part or substitute applications) to Assignee for the entire term of the issued Patent and any reissues or extensions that may be granted and for the entire terms of any and all foreign patents that may issue from foreign applications (as well as divisions, continuations in whole or part or substitute applications) filed claiming the benefit of the Patent Application.

The right, title and interest is to be held and enjoyed by Assignee and Assignee's successors and assigns as fully and exclusively as it would have been held and enjoyed by Assignor had this assignment not been made.

Assignor further agrees to: (a) cooperate with Assignee in the prosecution of the Application and foreign counterparts; (b) execute, verify, acknowledge and deliver all such further papers, including patent applications and instruments of transfer; and (c) perform such other acts as Assignee lawfully may request to obtain or maintain the Patent for the invention in any and all countries.



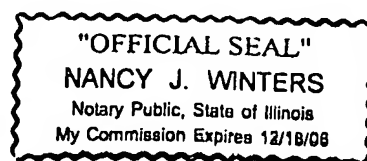
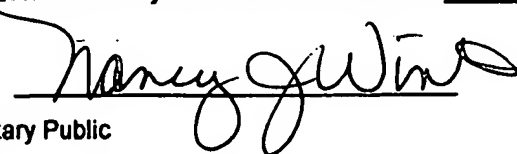
Brian L. Tafel

April 23 2005

On this 23rd day of April 2004, before me, Nancy J Winters, the undersigned Notary Public, personally appeared Brian L. Tafel, Assignor, personally known to me (or proved to me on the basis of satisfactory evidence) to be the person whose name is subscribed to the within instrument, and acknowledged to me that he executed the same.

WITNESS my hand and official seal in _____ County of Cook on the date set forth in this certificate.

Notary Public





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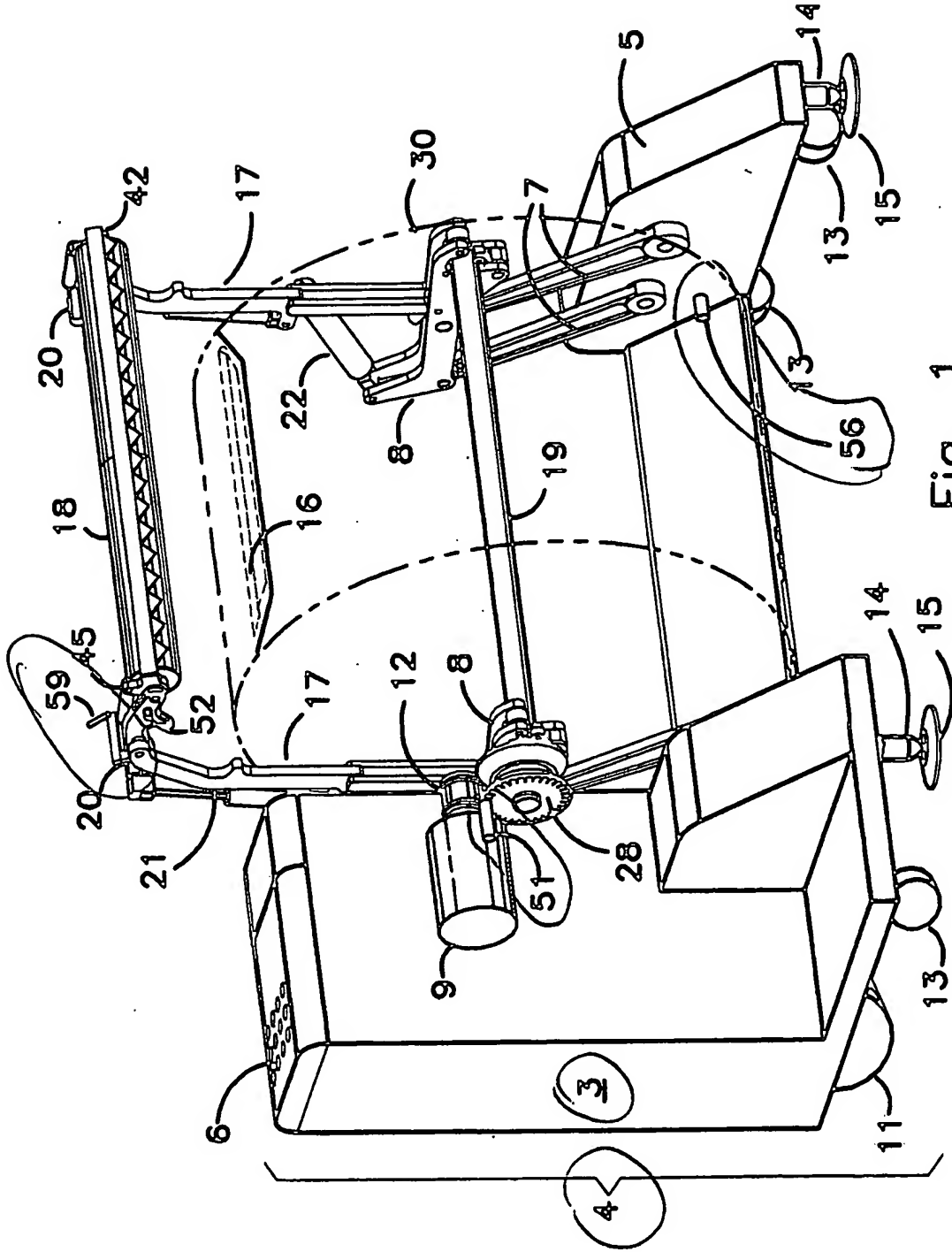


Fig. 1

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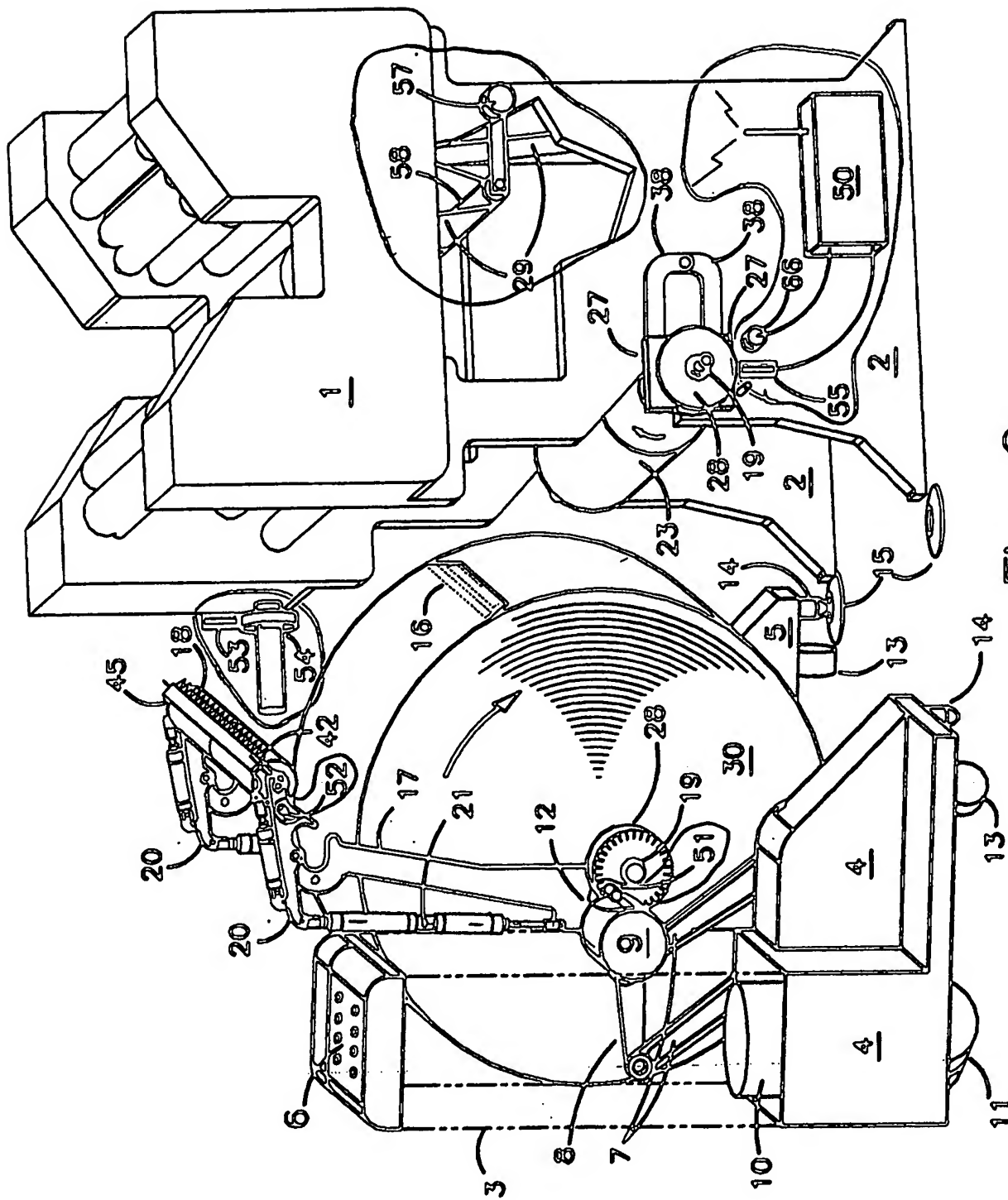
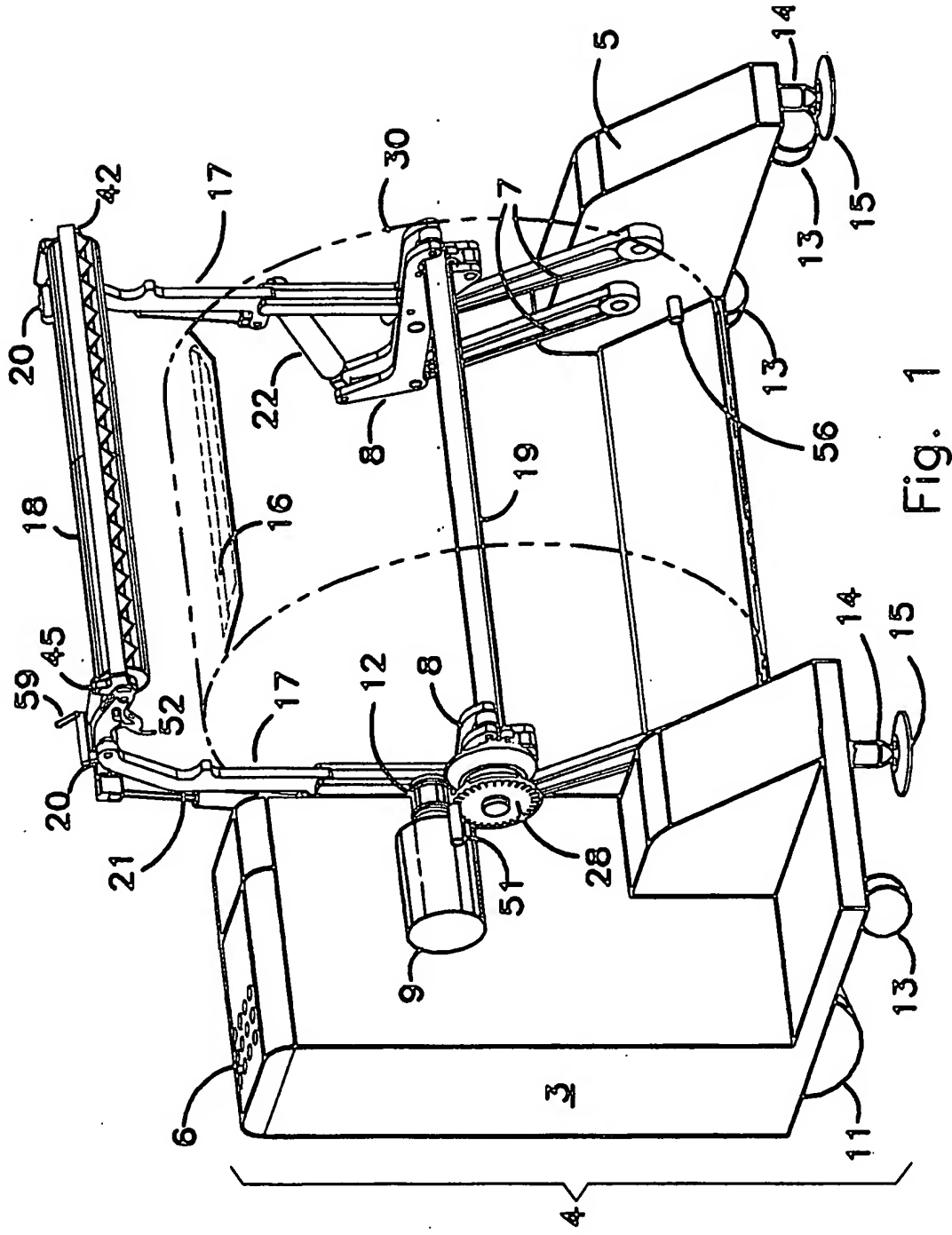


Fig. 2

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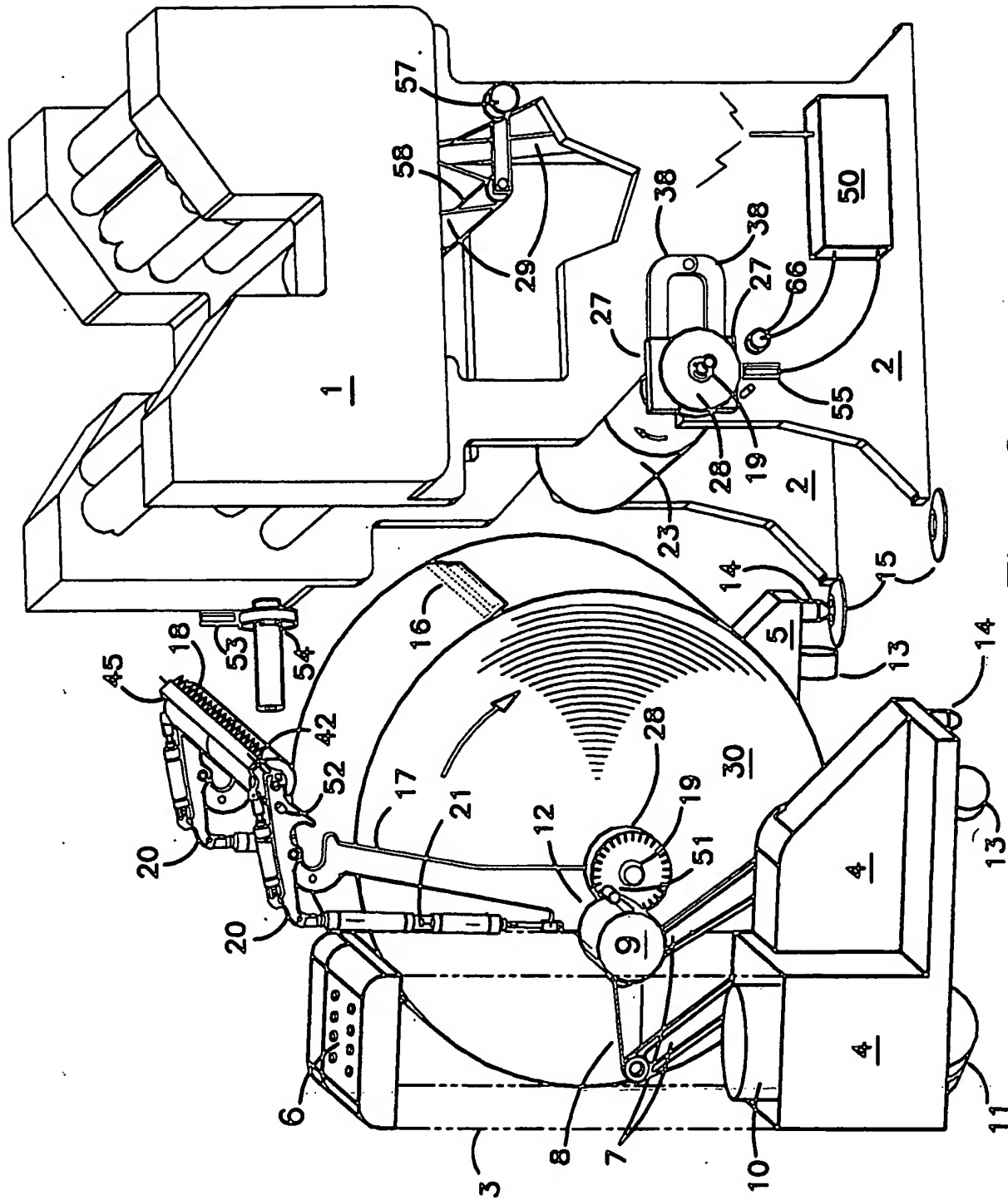


Fig. 2



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SPECIFICATION

BACKGROUND OF THE INVENTION

The present invention relates to web splicers which form an automatic flying splice between a new roll and a web of material running from an expiring roll. More particularly, it is directed to a vehicular transporting and splicing apparatus for rolls of web material wherein a single apparatus may service several unwinding devices. The primary use for the present invention is likely to be printing and converting paper and plastic film, although other materials and uses may be handled using the present technology.

The present manual unwind stand operations on smaller web presses without splicers proceed as follows: when an unwinding roll is essentially depleted, the printing press is stopped, and the web connected to the web-consuming machine is manually severed from the remainder of the roll. The roll and coreshaft assembly is then manually lifted from the unwind stand. A new roll on a dolly is then moved next to the unwind stand and levered up into the unwind position, where it is then hand spliced onto the severed end of the web. The press is restarted and after several minutes of continuously producing waste, production resumes.

These manual operations are time-consuming, wasteful, arduous and injury-prone.

To avoid downtime of the web-consuming machine, two main concepts have been used to design a splicer to connect a new roll to the running web, especially on printing presses. Some use a festoon to store a sufficient length of web to allow a stationary splice to be made, while the depleting festoon continues to supply a moving web.

Other types of splicers, referred to as flying splicers or speed match splicers, make a splice automatically at operating speed by matching the surface velocity of the new roll to that of the expiring web, and rapidly adhering the end of the outer wrap of the new roll onto the expiring web. Most speed match splicers utilize a surface drive on the new roll. This requires that one or two areas across the width of the web be free of adhesive, which allows the high-velocity air used in most dryers to enter this slot in the splice, inflating it and often causing a web-break. Examples of prior art are:

McDonald U.S. No. 3,740,296, teaches the use of pivoted arms to support rolls.

Phelps U.S.No. 3,831,876, teaches a core chuck driven roll, and describes the splicing mechanism and ability to splice either the inside or outside of the paper facing upward.

Tafel U.S. No. 4,729,522, uses a surface belt drive with the disadvantage mentioned above, of not having a continuous adhesive pattern across the face of the new roll.

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To overcome on this particular objection, the present invention drives the roll by its coreshaft. An example of this general type of splicer is taught in Martin 5,335,870 which is especially useful for printing presses having only one or two webs, or which are fed at right angles to the pressrow by web turning bars.

Both types of splicing machines are quite large, occupying a volume many times that of the rolls they process. When used with printing presses and converting lines, it is often necessary to reconfigure the entire operation to provide sufficient additional space for these splicers and space to load them. Further, there is considerable expense involved, as one splicer must be provided for every web, and in newspaper applications, multiple webs are customary. Another means of solving the floor space problem has been to stack splicers on top of one another, but this requires operators to climb ladders and work off of platforms, hoisting devices on rails, and all the webs must be strung down to floor level and under the presses.

BRIEF DESCRIPTION OF THE DRAWINGS

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Reference is made in the foregoing description to paper and printing, but the same concepts and apparatus may be applied to many different web consuming operations. In the detailed description of the invention which follows, reference will be made to the accompanying drawings composed of the following figures:

Fig. 1 is a pictorial view of the splicer vehicle in its preferred embodiment, showing the splicer vehicle conveying an expired roll. The splicehead arms are raised.

Fig. 2 is a pictorial view of the splicer vehicle in its preferred embodiment, conveying a roll into position adjacent to an unwind located under a small printing press.

Fig. 3 is a front view of the splicer vehicle at the beginning of a splice cycle, showing the web from a dispensing roll being spliced onto a new roll .

Fig. 4 is a front view of the splicer vehicle in its preferred embodiment, showing its roll lifting arms having moved the newly-spliced roll into dispensing position after having lifted the expired roll up out of the way.

Fig. 5 is a detailed pictorial view of the new roll, the web-repositioning idler-roller, severing knife, and splicehead positioning arm, immediatly after a splice. The view is shown truncated at the centerline

Fig. 6 is a pictorial view showing the roll lifting assembly about to move down and engage the coreshaft of a new replacement roll.

Fig. 7 is an pictorial view of the roll lifting assembly and engaging mechanism in its locked position.

Fig. 8 is a pictorial view of the splicer vehicle adapted to load stacked rollstands.

Fig. 9 is a pictorial view of the splicer vehicle adapted to function with core chucks, rather than a coreshaft. The splicer vehicle is shown conveying a new roll. The splicehead arms are raised and each shown engaging a core chuck.

Fig. 10 is a pictorial showing the means of roll axial adjustment.

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**DETAILED DESCRIPTION OF THE
PREFERRED EMBODIMENT**

The present invention relates to apparatus to form a flying splice wherein new-rolls of material are supported within a vehicle equipped with a lifting mechanism to lift and position new-rolls, and incorporating a splicing mechanism to splice the outer wrap of material onto expiring rolls in at least one unwind stand. Optional provision is made to retain the rotational direction of the actively unwinding roll before and after splicing, an advantage when using paper having different finishes on each side.

Although the following terminology refers primarily to printing and paper, it must be understood the present invention is applicable to any of a variety of web-consuming devices or materials.

The sequence of operation for the present invention as it applies to paper and plastic film is generally as follows:

In a web printing or converting production line, a web utilizing device is provided with a web from a splicer, or from an unwind stand. In the case of an unwind stand, the present invention provides a means to automatically splice a new roll onto the dispensing roll in the unwind stand, thereby supplying a continuous, uninterrupted web supply to the web utilizing device without the expense of having a splicer for each web.

When it is determined, either visually, or by automatic sensing devices, that the roll dispensing a web is substantially depleted, the present invention provides a vehicular splicer to retrieve a new roll from a storage area and to splice a web from that roll onto the web of the roll being dispensed. The new roll must first be unwrapped and a coreshaft inserted and locked into the hollow core of the new roll, and this assembly is hereinafter referred to as the "second roll assembly". A pair of parallel roll lifting arms then extend from the splicing vehicle and engage each end of the coreshaft and lift it the second roll assembly off the floor and into the interior of the vehicle for transport to a predetermined location next to the roll unwind. Pins are then lowered from the splicing vehicle into sockets in the floor, accurately locating the vehicle.

When the dispensing roll is depleted sufficiently to allow a splice, the roll lifting arms extend to move the new roll from the vehicle until the circumferences of the new roll and the dispensing roll are less than approximately two inches apart and parallel. The splicehead arms then lower the splicing mechanism down over the coreshaft of the dispensing roll. The new roll is then rotated to a surface velocity approximating the velocity of the dispensing web, at which time the splicing roller brackets are pivoted to redirect the dispensing web out of the roll unwind device and against an adhesive area on the outer wrap of the new roll, thereby effecting a splice.

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A severing knife then detaches the splice from the expired roll. The new-roll drive motor goes into a braking mode responsive to a web tension indicated by a web-tension sensor mounted in the unwind stand, and maintains web tension at a operator established set-point until the roll is moved into position in the unwind web-stand web, at which time tensioning is provided
5 by the braking means normally provided by the unwind stand. The expired roll is then removed from the press, the roll support arms are retracted, and the vehicle is moved away from the press, supported on its wheels. The arms are then lowered to a convenient height and the coreshaft removed from the splicehead arms for recycling into a new roll.

Referring now to pictorial view Fig.1 of the splicer vehicle in its preferred embodiment,
10 showing the splicer vehicle 4 conveying a new roll 30 which is loaded into the roll lifting arms 8. The splicehead arms 17 are raised by linear actuator 22. The splicer vehicle consists of an operator-side housing 3 with operator control panel and attached computer 6, and a drive-side housing 5, all supported on castered wheels 13 and driven wheel 11. Protruding from the underside are aligning pins 14 and 15 which are lowered into alignment disks 15
15 having elongated slots which are affixed to the pressroom floor immediately adjacent to the web-consuming device to provide accurate positioning of the splicer vehicle with respect to that device. Sensor 56 limits the positioning of the new roll during loading and thereby indicates the new roll diameter by referencing the position of arms 7.

Referring now to pictorial view Fig.2, the preferred embodiment is shown moving into a
20 splicing position adjacent to a small web press 1 of common design having an unwind stand 2 beneath it which rotationally supports dispensing roll 23 having coreshaft 19 with brake drum 28 rigidly affixed thereto, hereinafter referred to as the "first roll assembly" so disposed that the brake regulates the web tension in the conventional manner of a rollstand by referencing a dancer-roll position 59 with sensor 58. New roll 30 is shown mounted into the splicing vehicle
25 with a splice pattern 16 already prepared. Signals between the vehicular splicer and web consuming device are transmitted between a transceiver in the vehicular splicer control-panel-computer assembly 6 and a transceiver 50 on the web-consuming device. Sensor 51 indicates the RPM of the new roll and sensor 52 indicates the RPM of splicing roller and thus the web speed. Sensor 53 indicates RPM of the driveshaft 54 of the
30 web-consuming device 1. Sensor 55 located on the vehicular splicer indicates the RPM of the new roll assembly.

Fig.3 is a front view at the beginning a splice cycle. New roll 37 illustrates the smallest new roll that may be accommodated, and new roll 30, shown in phantom lines, illustrates the largest roll that may be accommodated. The roll-lifting arms 8 with their roll retaining latches
35 activated by actuators 36, have been moved into the splice position by the rotation of pivoting arms 7. The splicehead-arms 17, each raised and lowered by contraction and extension of

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linear actuator 22, and each having a splice roll bracket 20 operated by actuator 21, acting in combination to support splicehead shaft 46 at each of its ends, including the resilient splicing roller 18 and severing knife 42 supported thereby. The splice roll bracket 20 is shown (in bold lines) as the splicing roller first contacts dispensing web 29 and also in a second position, in phantom lines, after it has rotated approximately 90 degrees of revolution to press the dispensing web against the adhesive area on the new roll 37, thereby effecting a splice between the web from the dispensing roll and the outer wrap of the new roll. Operative rotation of severing knife 42 by shaft 46 then detaches the web from the dispensing roll in the unwinding stand to complete the splice cycle, whereupon the splicehead arms and splice roll bracket 20 acting in combination with the splicing roll 18, grasp and remove this roll from rollstand support bearing- 47 saddles 24 to the location shown over the top of the vehicle. The splicing vehicle is then moved to a location where the arms can be lowered and the coreshaft removed.

Referring now to front view Fig.4, the pivoting arms 7 and lifting arms 8, move collectively and in unison to place the new roll coreshaft 19 and new roll 30 into bearing saddles 24. Acting collectively and in unison, brake arms 38 then operatively rotate together and cause the brake pads 27 supported thereby, to grasp brake drum 28 and thereby restrain its rotation, and causing tension to be maintained in the dispensing web 29.

Pictorial view Fig. 5 shown truncated at the centerline of the apparatus, illustrates the splicing elements in enlarged detail, immediatly after splice 25 joined the end of web 41 from expired roll 18, to exiting web 29 from the new roll 30. Splicing roller brackets 20 are preferably pivotably supported by splicehead arm 17, and are caused to pivot by splicing roll linear actuator 21. Shaft 46 rotatably supports roller 18 by bearings 47 on which are also positioned splicing roller brackets 20. Knife 42 is affixed to clamping blocks 45, which rigidly clamp onto operatively rotatable shaft 46. Upon operative rotation of said shaft, the dispensing web 25 is severed. The hooked shape of bracket 20 aids in confining and subsequently grasping the coreshaft 19.

Fig. 6 is a pictorial view showing the roll lifting assembly just prior to moving down and engaging the coreshaft 19 of a new replacement roll 30. Actuator 36 has retracted, which rotates triangular block 35 Counterclockwise about pin 26. Toggle link 34 which is rotatably attached to the triangular block, pulls on roller link 32, causing it to rotate into an open position to accept the coreshaft 19.

- 1 Fig. 7 is an pictorial view of the roll lifting assembly in the clamped condition. The coreshaft is omitted for clarity. Actuator 36 has extended, rotating triangular block 35 clockwise about pin 26. Toggle link 34 which is rotatably attached to the triangular block , pushes on roller link 32 and toggles over-center, causing the roller link to rotate into a closed position to grasp the
- 5 coreshaft 19, and to remain locked in that position in the event the energy source to the actuator is accidentally interrupted. The coreshaft is supported between rollers 31, which are arrayed in a triangle.

Fig. 8 shows a two-high stacked rollstand being serviced by a modification of the basic design, wherein the lifting and splicing mechanism 39 is supported on an elevating track

10 mechanism 44. A significant advantage of the present invention is that, after the new roll is loaded into the splicing vehicle, the splicing and core retrieval process requires no operator.

Pictorial view Fig. 9 of the splicer vehicle, shows the splicer vehicle 4 conveying a new roll 30 having core chucks 48 inserted into each end of the roll core. Core chucks are commercially available of various designs. One type is the so-call self-actuating chuck which has a torque

15 sensitive mechanism that expands the chuck inside the roll core responsive to a driving or braking torque. Other types of chucks are operated either mechanically or by pneumatics. In the present invention, the core chucks are being rotatably supported in roll lifting arms. The chuck arms 47 with chuck bearing housing 49 are shown raised, with each arm holding a core chuck for subsequent insertion into a new roll.

20 Pictorial view Fig. 10 shows automatic axial roll positioning means to align with the new roll to the dispensing roll. When splicehead support arms 17 (in Fig.2), supporting edge sensor 59 are partially lowered, the face of the dispensing roll 23 (in Fig.2) is detected. Servo-motor 60 then turns screw 61 which pulls link 62, causing pins 63 which engage arms 64 to rotate said arms about pivots 65, said arms also supporting tapered alignment pins 14. Said tapered

25 alignment pins have been inserted into alignment disks 15 which are rigidly located in the floor and act as a fulcrum whereby the rotation of said arms 64 causes the splicing vehicle 4 & 5 to be repositioned along the axis of the new roll until sensor 59 detects the edge of roll 23.

The foregoing description of the preferred embodiment of the invention has been presented for purposes of illustration and description. It is not intended to be exhaustive or to limit the

30 invention to the precise form disclosed. Many modifications and variations are possible in light of the above teaching. It is intended that the scope of the invention be limited not by this detailed description, but rather by the claims appended hereto.

CLAIMS

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I claim:

1. A transport and splicing apparatus under the control of a computer,
for supplying successively used rolls of web material to at least one web utilizing
5 device from the roll unwinding devices associated therewith,
as an uninterrupted, continuously feeding web,
by splicing said web from an at least partially depleted dispensing first roll of web
material in said unwinding device,
to a replacement second roll supplied by said transport and splicing apparatus
10 consisting essentially of :
coreshaft means rigidly assembled into the central cores of said first roll and said second
rolls, hereinafter referred to as the "first roll assembly" and the "second roll assembly"
respectively.
a roll transport vehicular means, ~~engaged by~~ supporting an operative roll positioning
15 means for rotatably engaging and positioning said second roll ~~coreshaft means~~
assembly into a predefined spatial relation to said dispensing first roll of material,
a driving means for operatively controlling the rotation of said second roll assembly,
an operative splicing and web-severing means attached to said roll transport
vehicular means by a pair of articulated arm means,
20 operative arm means supported by said roll transport vehicular means,
to engage and remove the said first roll assembly from said unwind device,
said operative roll positioning means thereafter moving said second roll assembly into the
former position of said first roll assembly in said unwind device,
thereby converting said replacement second roll into a dispensing first roll.
- 1 2. A roll transport vehicular means consisting essentially of:
a transport vehicle including a frame structure, computer controls and sensors,
operator controls, ~~battery~~, operative roll positioning means, operative roll
rotation means, splicing and severing means, a roller, roller positioning means, and
5 supporting wheels,
acting in combination to transport a second roll of material from a storage location
into a predefined spatial relation with a first dispensing roll in an unwind device, and
adapted to perform a flying splice with said first roll, and
to thereafter replace said first roll with said second roll.

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3. The apparatus in claim 1 wherein said an operative roll positioning means attached to said roll transport vehicular means ~~consists~~ consisting essentially of:
a pair of gripper bars, each gripper bar supporting an operative coreshaft gripper,
one gripper disposed at a first end of said coreshaft,
5 and one gripper disposed at a second end of said coreshaft,
to engage and position said second roll ~~coreshaft~~ assembly,
while allowing said ~~coreshaft~~ second roll assembly to rotate about its axis,
where each of said gripper bars is operatively positioned by actuators and levers
responsive to signals from said computer,
10 the circumferential outer surface of said second roll assembly thereby being moved into
proximal juxtaposition with said dispensing first roll,
prior to the beginning of the splice cycle.
4. The apparatus as described in claim 1, wherein the driving means to control the
rotation of said second roll consists of:
an electronic motor-drive means responsive to a speed-signal calculated by said
computer primarily based on the arithmetic quotient of, the indicated web
5 utilization velocity from a web velocity sensor ~~located on the web-utilizing device~~,
divided by the indicated diameter of said second roll from a sensor located on said
transport and splicing appatatus,
said a motor being provided with a rotary drive means coupled to said coreshaft to
operatively control the rotation of said coreshaft,
10 so disposed that said motor rotates said second roll at a surface velocity
approximating the web utilization velocity during the time before the splice
cycle,
and during the time after the splice cycle,
said motor-drive signal from said computer generally being a braking-torque
15 signal based on the indicated web tension to the computer from a sensor
preferably located in said ~~web-utilizing device~~,
whereby the rotational velocity of said second roll regulates an essentially
constant web tension during and after the splice cycle.

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5. The apparatus as described in claim 1 wherein said splicing and web-severing means consists essentially of:

- a pair of pivoted, spaced and parallel splicing arms, attached to said transporting and splicing apparatus,
- 5 said apparatus also supporting operative actuators to position each of said splicing arms,
- each arm supporting an operatively pivoted bracket,
- said brackets supporting a first and second end of an operatively rotatable idler roller shaft,
- 10 said roller shaft supporting on bearings a rotatable idler roller,
- said roller being so disposed as to redirect the path of web of said dispensing first roll of material during the splice cycle so that said dispensing web contacts the outer circumferential surface of said second first roll to cause an adhesive area on the outer wrap to be forcibly contacted by said dispensing web,
- 15 thereby forming a splice, and
- said roller shaft also having clamped rigidly thereto at each end,
- a pair of clamping blocks supporting a web severing means,
- said severing means being comprised of an elongated, serrated blade each end of which is rigidly attached to said blocks
- 20 to operatively sever the spliced webs dispensing web simultaneously and in combination from said dispensing first and second rolls of material, from said first roll splice.

6. The apparatus as described in claim 1, wherein the means to remove said first second roll after the splicing cycle consists essentially of:

- a pair of splicer arms adapted to support and position each end of said splicing and severing mechanism into parallel proximal juxtaposition to said second roll,
- 5 and also to pivotably support and position a pair of splicing roller brackets,
- said brackets rotatively supporting a splicing roller,
- said splicing roller being adapted to redirect the path of the unwinding dispensing web, such that the web contacts said second first roll, thereby forming a splice,
- and after the splice cycle is completed,
- 10 said roller and said bracket assembly grasps said first second roll and the coreshaft located therein,

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- 12 the pair of splicer arms thereafter being moved in a path such that said roller and bracket assembly in combination with said ~~first~~ ~~second~~ roll supported thereby, are removed from said unwind device.

7. The apparatus as described in claim 1, including computer operative means for automatically aligning the supporting mechanism of said first roll with said second roll such that the center-lines of said first roll and said second roll are parallel and the faces of both rolls are coplanar.

8. The apparatus as described in claim 1, including an elevating mechanism being provided to raise the carriage which supports:

a roll positioning means.

a driving means for operatively controlling the rotation of said second roll assembly.

a splicing and web-severing means.

and means to engage and remove said first roll assembly from said unwind device after the first roll has been spliced to the second roll ,

~~roller-supporting, loading, splicing and core retrieval mechanisms~~

such that upper levels of a multilevel unwind device may be serviced by said apparatus

9. The apparatus as described in claim 1 including signal broadcasting and receiving means attached to said vehicular means and the web utilizing device,

to provide operational information including, ~~but not limited to,~~ web utilization speed, the diameters of the dispensing rolls, and emergency stops,

and to automatically guide said vehicular means into a predetermined spatial relation to said unwinding devices.

10. The apparatus as described in claim 1 wherein a sequence of rolls of material having a variety of characteristics may be successively supplied to a variety of web utilizing devices.

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11. The apparatus as described in claim 1, wherein the coreshaft means is comprised of: a pair of selectively operative core chucks, internally engaging said rolls of material in the center of each end of said second roll, said chucks being selectively engaged and supported by a pair of spaced, parallel,
5 and operatively pivoted chuck arms,
said chuck arms being so disposed as to operatively place said chucks into the center of said second rolls,
whereby said operative arm means may subsequently engage, lift and position said second rolls during the transport, splicing, and positioning of said second rolls into a
10 pair of rotatable engagement means in said unwind device,
so disposed at each end of said rolls as to rotatably engage said chucks,
and after said first rolls are spliced, said chuck arms are so disposed as to engage and remove said first roll assembly from said unwind device,
said operative arm means thereafter moving said second roll assembly into the former
15 position of said first roll in said unwind device,
thereby converting said replacement second roll into a dispensing first roll.

(Claim 12 added)

12. The apparatus as described in claim 1, wherein the method and means to remove said first roll assembly after the splicing cycle consists essentially of:
a pair of splicer arms supported by said transport and splicing apparatus adapted to support and position each end of said first roll assembly,
5 said pair of splicer arms thereafter being moved in a path such that said first roll supported thereby is raised above the roll transport and splicing apparatus,
said roll transport and splicing apparatus including said splicer arms then being moved to a location remote from the web utilizing device,
said pair of splicer arms then being lowered to a convenient height for removal by an
10 operator or automatic means,
the core gripping means then being selectively operatively released,
thereby discharging the coreshaft and expired roll assembly from said splicer arms.